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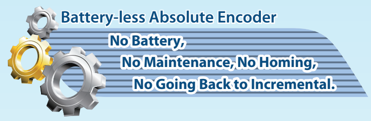
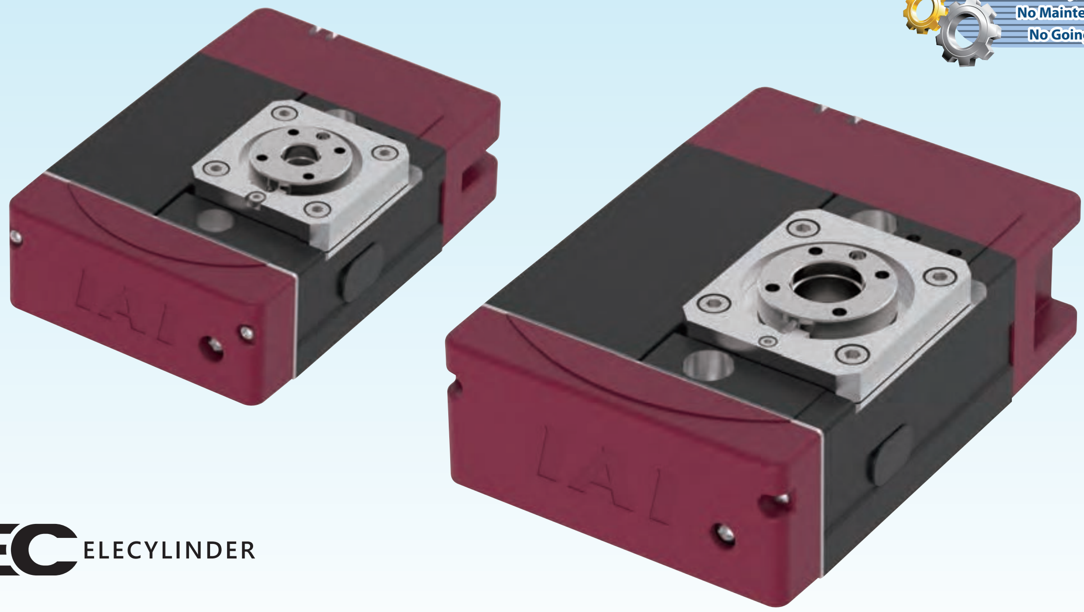
Quality and Innovation

GB

Simple-to-use ELECYLINDER with Built-in Controller Small Rotary Type with Flat-oriented Motor EC RTC9

Simple-to-use ELECYLINDER with Built-in Controller Large Rotary Type with Flat-oriented Motor EC RTC12





ELECYLINDER

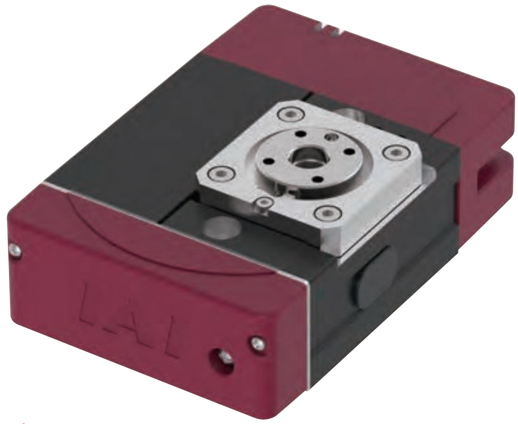
Simple & Wireless Operation

2 Position Actuator

www.elecylinder.de

2-point positioning | Built-in controller

EleCylinder EC-RTC9/RTC12 Rotary type



Smooth stopping without impact

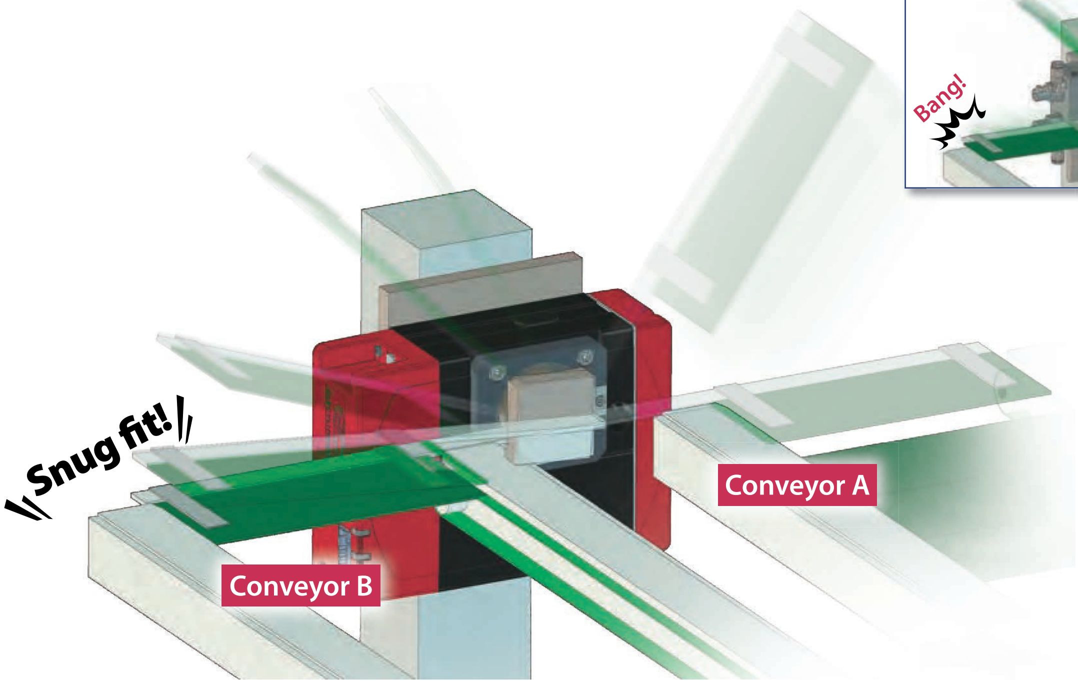
EleCylinder allows the acceleration (A), velocity (V), and deceleration (D) to be set using numeric values. This allows the deceleration speed to be adjusted for smooth stopping without impact.

Circuit board turnover system

The **rotary cylinder** turns over circuit boards carried by conveyor A , and loads them on conveyor B

Conventional system (air rotary)

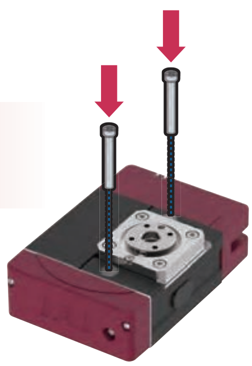
High speed impact



Can be bolted from the top

Installation bolt size	RTC9: M6 RTC12: M8

*Bolts should be prepared by the customer.

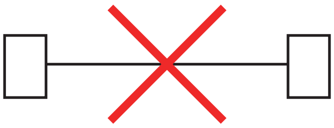


Wireless connection (option) eliminates annoying cable connections!

Touch Panel
Teaching Pendant
TB-03

Wireless

[Approx. 5m (guideline)]



Cable not required

EleCylinder

Model Specification Items

EleCylinder

EC	–	☐	M	–	330	–	☐	–	(☐)
Series		Type	Deceleration ratio		Oscillation angle		Cable length		Options

Type

RTC9	Flat type S size 90mm wide
RTC12	Flat type L size 117mm wide

Deceleration ratio

M	1/45

Oscillation angle

330	330 degrees

Cable length

0	0m
~	~
10	10m

Cable length
· 0: With power / I/O connector
· 1 ~ 10: Power I/O cable included

Options

Left blank	Incremental encoder specification, NPN specification, no option
B	With brake
NM	Non-motor end specification
PN	PNP specification
SA	Shaft adapter
TA	Table adapter
TMD2	Twin power supply specification
WA	Battery-less Absolute Encoder specification
WL	Wireless communication specification
WL2	Wireless axis operation specification

Duty Ratio

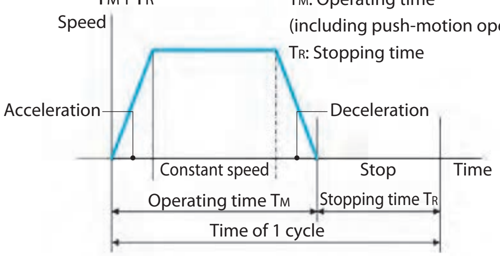
EC-RTC9/RTC12 can be operated at 100% of its duty cycle.
(Ambient temperature 0~40°C.)

[Duty Cycle]

Duty cycle is the percentage of the actuator's active operation time in each cycle.

$$D = \frac{T_M}{T_M + T_R} \times 100(\%)$$

D: Duty
T_M: Operating time
(including push-motion operation)
T_R: Stopping time



Selection Method

The following conditions must be satisfied for use. Calculate and check the following values (procedures 1 and 2).

Procedure 1

Check the moment of inertia
(1) If there is no load torque
(2) If there is load torque
*The method for checking the moment of inertia differs depending on whether or not there is a load torque.

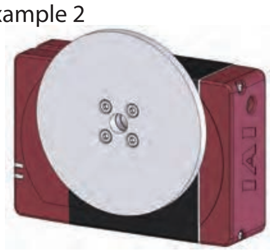
(1) If there is no load torque

When used as shown in the figure below, there will be no load torque due to gravity. Therefore, calculate the moment of inertia of the load only, and then confirm that it does not exceed the allowable inertia moment. Use the calculation method for the applicable typical shape (P. 4) to calculate the moment of inertia for the tooling or workpiece that will be used.

Example 1

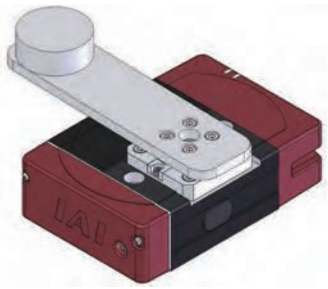
Center mass location of load: Output shaft center
Installation orientation: Horizontal on flat surface/suspended

Example 2



Center mass location of load: Output shaft center
Installation orientation: On side/vertical

Example 3

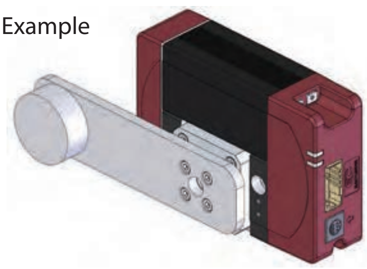


Center mass location of load: Offset from output shaft center
Installation orientation: Horizontal on flat surface/suspended

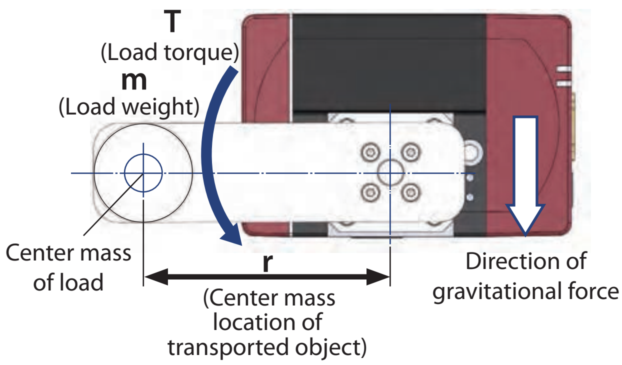
(2) If there is load torque

When used as shown in the figure below, there will be load torque due to gravity.
This will cause the allowable moment of inertia to decrease by that amount.
First, calculate the load torque and obtain the corrected allowable moment of inertia. Then, calculate the moment of inertia and confirm that it does not exceed the corrected allowable moment of inertia.

Example



Center mass location of load: Offset from output shaft center
Installation orientation: On side/vertical



Step 1 Calculate load torque T

$$T = mgr \times 10^{-3}\ [\mathrm{N\cdot m}]$$

m	: Weight of transported object	[kg]
g	: Gravitational acceleration	[m/s²]
r	: Center mass location of transported object	[mm]

Step 2 Calculate allowable moment of inertia correction factor Cj

$$C_j = \frac{T_{max} - T}{T_{max}}$$

T_{max}: Output torque [N·m]

*See the individual product pages for the value of output torque T_{max}.

Step 3 Calculate corrected allowable moment of inertia Jtl

$Jtl = Jmax \times Cj$ [kg·m²]

Jmax: Allowable inertia moment (kg·m²)

*See the individual product pages for the value of allowable moment of inertia Jmax .

Step 4 Check moment of inertia of transported object

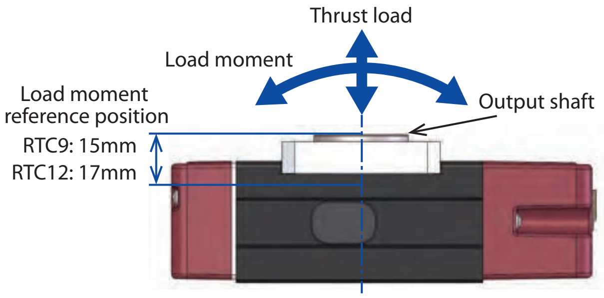
Use the "formulas for calculating moment of inertia of typical shapes" below to calculate the moment of inertia of the load, and confirm that it does not exceed the corrected moment of inertia calculated during Step 3.

Procedure 2

Check the moment load and thrust load

Confirm that the moment load and thrust load on the output shaft are within the allowable range. If used in excess of the allowable range, it could shorten product life or cause failure.

*See the individual product pages for the values of the allowable dynamic thrust load and allowable dynamic load moment.

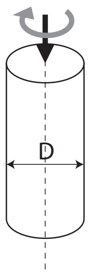


Formulas for calculating moment of inertia of typical shapes

1. When the rotational axis passes through the center of the object

(1) Moment of inertia of cylinder 1

*The same formula can be applied irrespective of the height of the cylinder (also for circular plate)



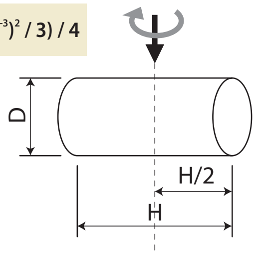
<Formula> $J = M \times (D \times 10^{-3})^2 / 8$

Moment of inertia of cylinder: J (kg·m²)
Cylinder weight: M (unit: kg)
Cylinder diameter: D (mm)

(2) Moment of inertia of cylinder 2

<Formula> $J = M \times ((D \times 10^{-3})^2 / 4 + (H \times 10^{-3})^2 / 3) / 4$

Moment of inertia of cylinder: J (kg·m²)
Cylinder weight: M (kg)
Cylinder diameter: D (m)
Cylinder length: H (mm)

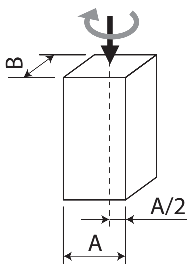


(3) Moment of inertia of prism 1

*The same formula can be applied irrespective of the height of the prism (also for rectangular plate)

<Formula> $J = M \times ((A \times 10^{-3})^2 + (B \times 10^{-3})^2) / 12$

Moment of inertia of prism: J (kg·m²)
One side of prism: A (mm)
One side of prism: B (mm)



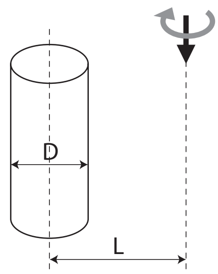
2. When the center of the object is offset from the rotational axis

(4) Moment of inertia of cylinder 3

*The same formula can be applied irrespective of the height of the cylinder (also for circular plate)

<Formula> $J = M \times (D \times 10^{-3})^2 / 8 + M \times (L \times 10^{-3})^2$

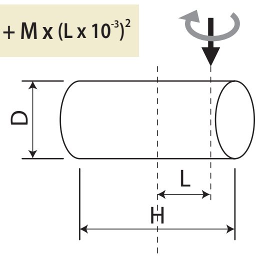
Moment of inertia of cylinder: J (kg·m²)
Cylinder weight: M (kg)
Cylinder diameter: D (m)
Distance from rotational axis to center: L (mm)



(5) Moment of inertia of cylinder 4

<Formula> $J = M \times ((D \times 10^{-3})^2 / 4 + (H \times 10^{-3})^2 / 3) / 4 + M \times (L \times 10^{-3})^2$

Moment of inertia of cylinder: J (kg·m²)
Cylinder weight: M (kg)
Cylinder diameter: D (m)
Cylinder length: H (mm)
Distance from rotational axis to center: L (mm)

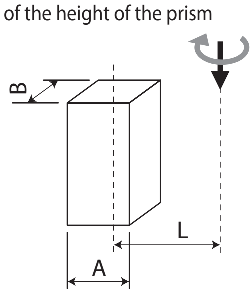


(6) Moment of inertia of prism 2

*The same formula can be applied irrespective of the height of the prism (also for rectangular plate)

<Formula> $J = M \times ((A \times 10^{-3})^2 + (B \times 10^{-3})^2) / 12 + M \times (L \times 10^{-3})^2$

Moment of inertia of prism: J (kg·m²)
Prism weight: M (kg)
One side of prism: A (mm)
One side of prism: B (mm)
Distance from rotational axis to center: L (mm)



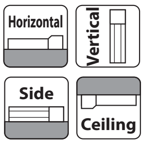
EC-RTC9

Simple Dust Proof | Rotary Type | Body Width 90 mm | 24v Pulse motor

■ Model Specification Items

EC	-	RTC9	M	-	330	-		-	
Series	-	Type	Deceleration ratio	-	Oscillation angle	-	Cable length	-	Options
			M: Deceleration ratio 1/45		330: 330-degree rotation		0: Terminal block type With connector 1: 1m ≀ 10: 10m		Refer to Options table below.

CE RoHS



Cable length

Cable code	Cable length
0	No cable (with connector)
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 10	6 ~ 10m

(Note) Robot cable.

Options

Name	Option code	Reference page
Brake	**B**	12
Non-motor end specification	**NM**	12
PNP specification	**PN**	12
Shaft adapter	**SA**	12
Table adapter	**TA**	12
Twin power supply specification	**TMD2**	12
Battery-less absolute encoder specification	**WA**	12
Wireless communication specification	**WL**	12
Wireless axis operation specification	**WL2**	12

POINT Selection Notes

(1) Output torque decreases as rotation speed increases. Refer to the "correlation diagram between rotation speed and output torque" for details.

(2) The allowable moment of inertia of a workpiece being rotated will vary depending on the rotation speed. Refer to the "correlation diagram between rotation speed and allowable moment of inertia" for details.

(3) The brake is used for retention purposes only, Do not use it for braking or emergency stopping.

(4) When selecting, calculate values as described in "Selection Method (from P. 3)" and check the usage conditions.

(5) If performing push-motion operations, refer to the "correlation diagrams between push force and current limit". The push forces listed are for reference only.

(6) The maximum acceleration/deceleration is 0.5G when horizontal/suspended, or 0.3G when on side/vertical.

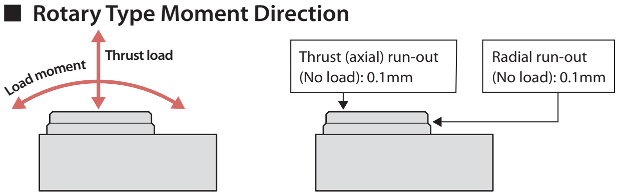
Main Specifications

Item		Description
Deceleration ratio		1/45
Max. torque (N·m)		1.5
Speed / acceleration/ deceleration (Note 1)	Max. speed (degrees/s)	600
	Min. speed (degrees/s)	20
	Rated acceleration/deceleration (G)	0.3
	Max. acceleration/deceleration (G) (Note 2)	0.5
Brake	Braking specification	Non-excitation actuating solenoid brake
	Brake retaining torque (N·m) (Note 3)	0.9
Operation range (degrees)		330

(Note 1) 1G≈9807°/s²
(Note 2) Horizontal only. The maximum acceleration/deceleration will be 0.3G when on side/vertical.
(Note 3) Both the allowable moment of inertia and brake retaining torque will not necessarily be established. Confirm that the load torque does not exceed the retaining torque.

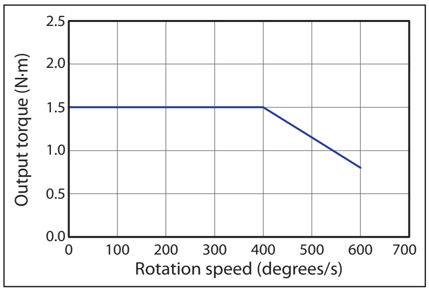
Item	Description
Drive system	Hypoid gear + timing belt
Positioning repeatability	±0.05 degrees
Homing method	Mechanical stopper method
Homing precision	±0.05 degrees
Backlash	0.2° or less
Allowable thrust load	50N
Allowable load moment	5N·m
Allowable moment of inertia	0.02kg·m²
Radial run-out	0.1mm or less
Thrust run-out	0.1mm or less
Ambient operating temperature/humidity	0 ~ 40°C, 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration & shock resistance	4.9m/s²
Motor type	Pulse motor
Encoder Type	Incremental
Number of encoder pulses	800 pulse/rev

■ Rotary Type Moment Direction

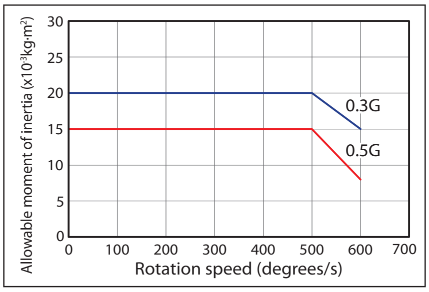


Correlation diagram between speed and output torque, allowable moment of inertia

■ Correlation diagram between rotation speed and output torque



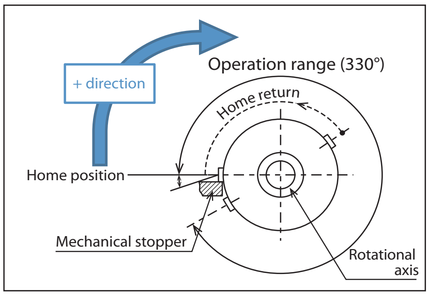
■ Correlation diagram between rotation speed and allowable moment of inertia



(Note) 0.5G can be used only when horizontal/suspended.

Homing method and positive rotation direction

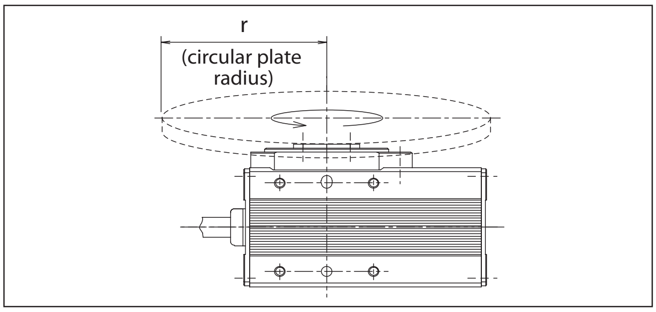
■ 330-degree rotation specification



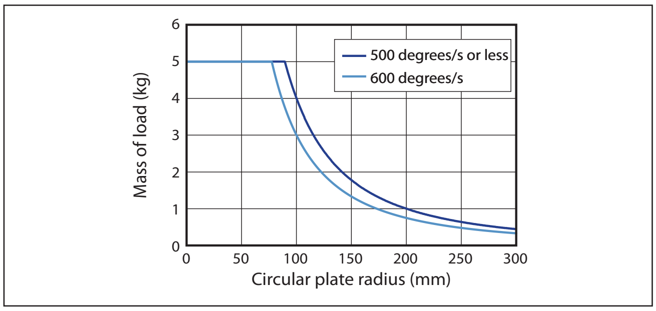
The positive rotation direction will be clockwise when viewing the rotating part from above.
During home return motion, it rotates counterclockwise.
It detects the mechanical stopper position, moves in reverse, and then stops.
It cannot rotate to the home return motion in the clockwise direction.
(Note) For the non-motor end specification, all movement directions are in reverse.

Guideline for load shape and mass

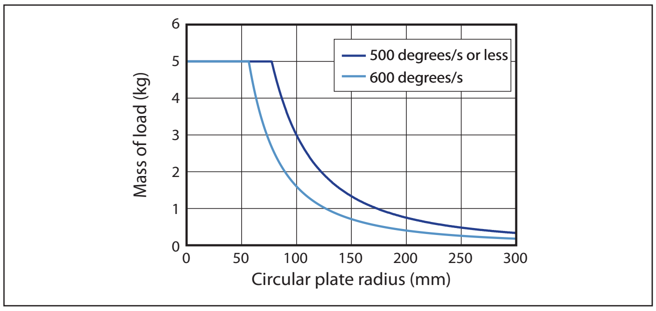
■ When the center of gravity of a circular plate load is the same as the rotational center of the output shaft



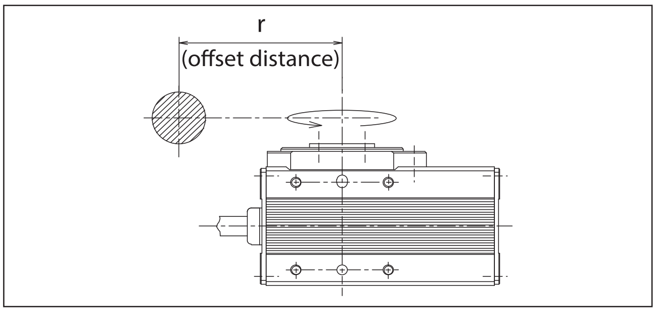
Acceleration 0.3G



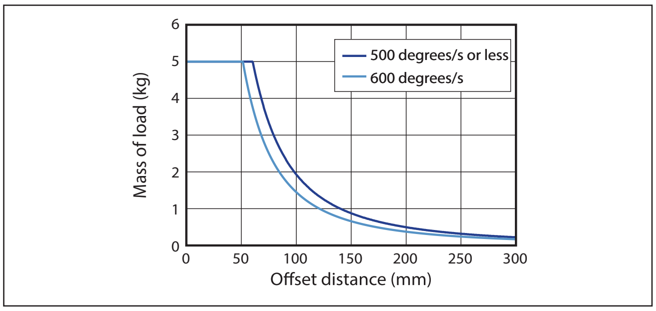
Acceleration 0.5G



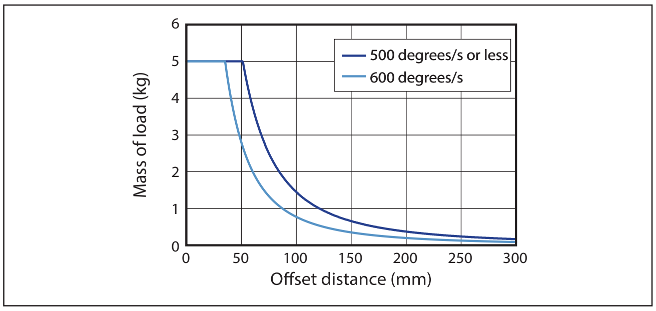
■ When the center of gravity of the load is offset from the rotational center of the output shaft



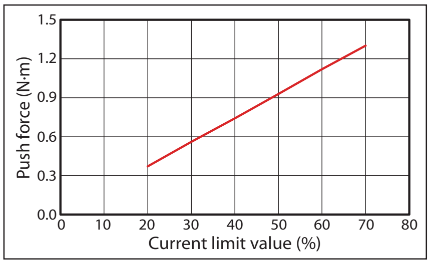
Acceleration 0.3G



Acceleration 0.5G



Correlation of push force and current limit value

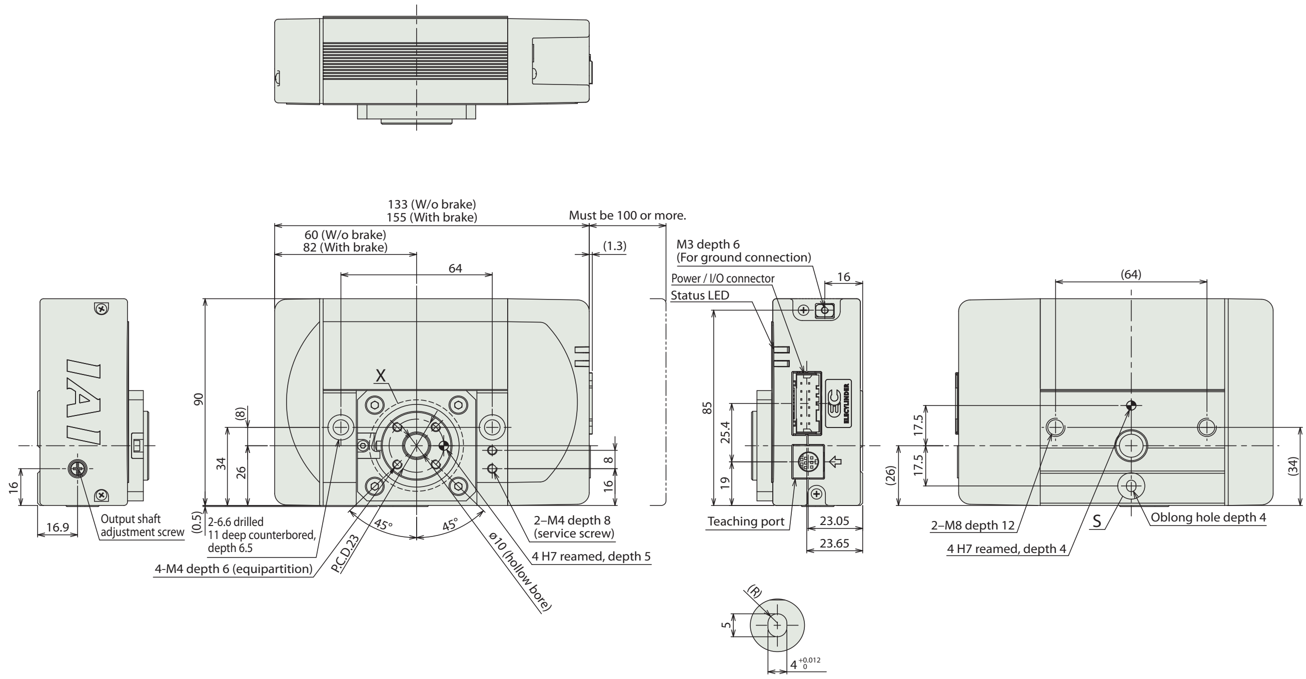


Dimensions

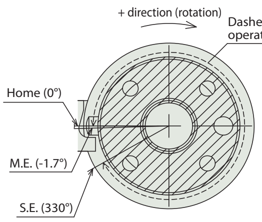
CAD drawings can be downloaded from our website.
www.elecylinder.de
2D CAD 3D CAD

(Note) Rotating parts are shown shaded in the plane figures below.

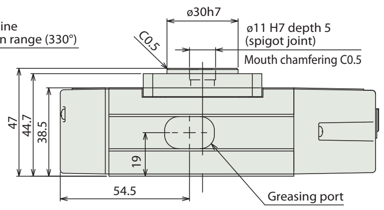
M.E: Mechanical end
S.E: Stroke end

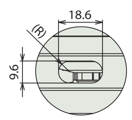


Detailed view of S
Details of base oblong hole

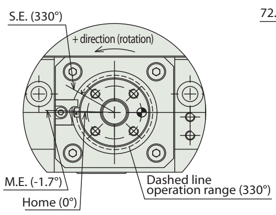


Detailed view of X

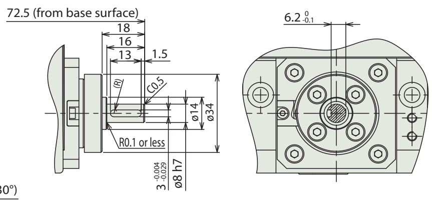




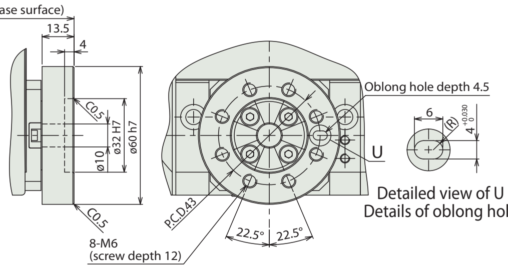
Grease lubrication port detailed view



Non-motor end specification



Shaft adapter specification



Detailed view of U
Details of oblong hole

Table adapter specification

■ Mass

Item		Description
Mass	Without brake	0.88kg
	With brake	0.98kg

Applicable controllers

(Note) The EC series is equipped with a built-in controller. Please refer to P.13 for more information on built-in controllers.

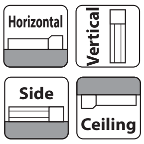
EC-RTC12

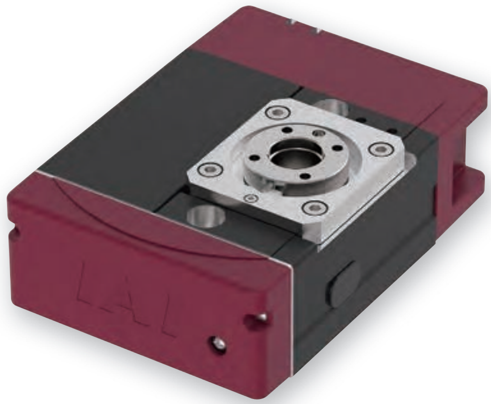
Simple Dust Proof | Rotary Type | Body Width 120 mm | 24v Pulse motor

■ Model Specification Items

EC	-	RTC12	M	-	330	-		-	
Series	-	Type	Deceleration ratio	-	Oscillation angle	-	Cable length	-	Options
			M: Deceleration ratio 1/45		330: 330-degree rotation		0: Terminal block type With connector		Refer to Options table below.
							1 ~ 10: 1m ~ 10m		

CE RoHS





Cable length

Cable code	Cable length
0	No cable (with connector)
1 ~ 3	1 ~ 3m
4 ~ 5	4 ~ 5m
6 ~ 10	6 ~ 10m

(Note) Robot cable.

Options

Name	Option code	Reference page
Brake	**B**	12
Non-motor end specification	**NM**	12
PNP specification	**PN**	12
Shaft adapter	**SA**	12
Table adapter	**TA**	12
Twin power supply specification	**TMD2**	12
Battery-less absolute encoder specification	**WA**	12
Wireless communication specification	**WL**	12
Wireless axis operation specification	**WL2**	12

POINT Selection Notes

(1) Output torque decreases as rotation speed increases. Refer to the "correlation diagram between rotation speed and output torque" for details.

(2) The allowable moment of inertia of a workpiece being rotated will vary depending on the rotation speed. Refer to the "correlation diagram between rotation speed and allowable moment of inertia" for details.

(3) The brake is used for retention purposes only, Do not use it for braking or emergency stopping.

(4) When selecting, calculate values as described in "Selection Method (from P. 3)" and check the usage conditions.

(5) If performing push-motion operations, refer to the "correlation diagrams between push force and current limit". The push forces listed are for reference only.

(6) The maximum acceleration/deceleration is 0.7G when horizontal/suspended or 0.5G when on side/vertical with the energy-saving setting disabled, or 0.5G when horizontal/suspended or 0.3G on side/vertical with the energy-saving setting enabled.

Main Specifications

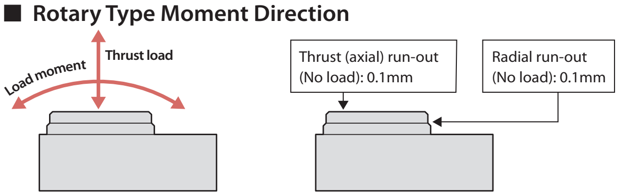
Item		Description
Deceleration ratio		1/45
Max. torque (N·m)		8.0
Speed / acceleration/ deceleration (Note 1)	Max. speed (degrees/s)	600
	Min. speed (degrees/s)	20
	Rated acceleration/deceleration (G)	0.3
	Max. acceleration/deceleration (G) (Note 2)	0.7
Brake	Braking specification	Non-excitation actuating solenoid brake
	Brake retaining torque (N·m) (Note 3)	5.3
Operation range (degrees)		330

(Note 1) 1G≈9807°/s²
(Note 2) Horizontal only. The maximum acceleration/deceleration will be 0.5G when on side/vertical.
(Note 3) Both the allowable moment of inertia and brake retaining torque will not necessarily be established. Confirm that the load torque does not exceed the retaining torque.

Item	Description
Drive system	Hypoid gear + timing belt
Positioning repeatability	±0.01 degrees
Homing method	Mechanical stopper method
Homing precision	±0.01 degrees
Backlash	0.2° or less
Allowable thrust load	400N
Allowable load moment (Note 4)	18N·m
Allowable moment of inertia	0.13kg·m²
Radial run-out	0.1mm or less
Thrust run-out	0.1mm or less
Ambient operating temperature/humidity	0 ~ 40°C, 85% RH or less (Non-condensing)
Degree of protection	IP20
Vibration & shock resistance	4.9m/s²
Motor type	Pulse motor
Encoder Type	Incremental
Number of encoder pulses	800 pulse/rev

(Note 4) 12N·m when on side/vertical.

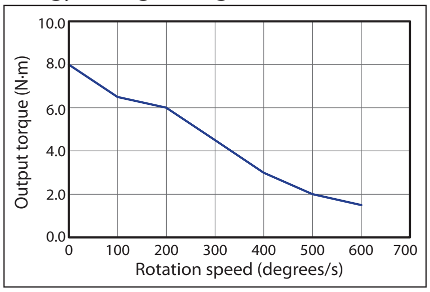
■ Rotary Type Moment Direction



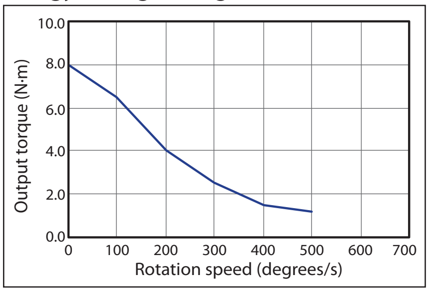
Correlation diagram between speed and output torque, allowable moment of inertia

■ Correlation diagram between rotation speed and output torque

Energy-saving setting disabled

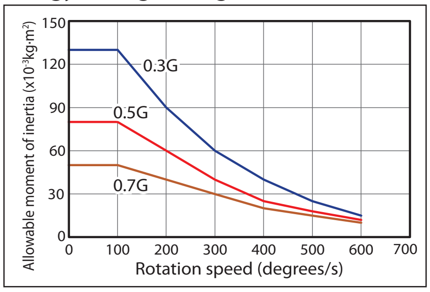


Energy-saving setting enabled



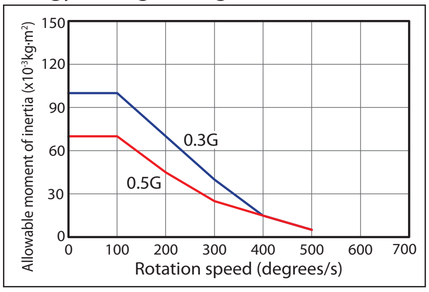
■ Correlation diagram between rotation speed and allowable moment of inertia

Energy-saving setting disabled



(Note) 0.7G can be used only when horizontal/suspended.

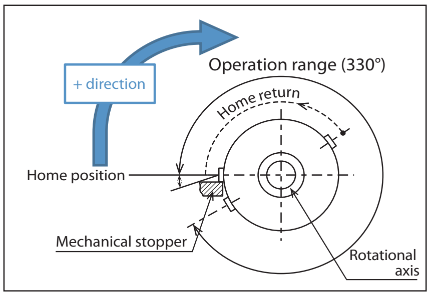
Energy-saving setting enabled



(Note) 0.5G can be used only when horizontal/suspended.

Homing method and positive rotation direction

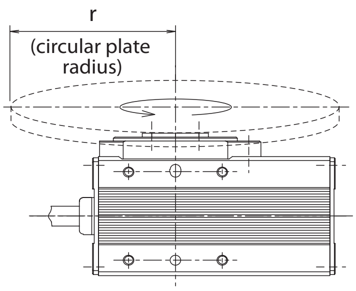
■ 330-degree rotation specification



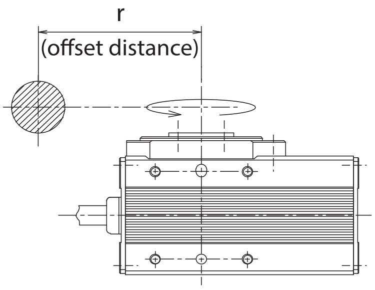
The positive rotation direction will be clockwise when viewing the rotating part from above.
During home return motion, it rotates counterclockwise.
It detects the mechanical stopper position, moves in reverse, and then stops.
It cannot rotate to the home return motion in the clockwise direction.
(Note) For the non-motor end specification, all movement directions are in reverse.

Guideline for load shape and mass

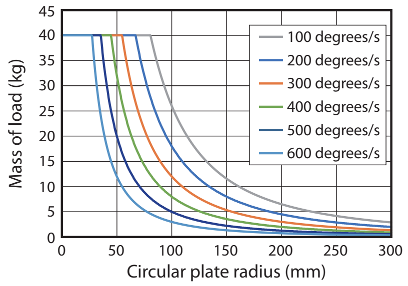
■ When the center of gravity of a circular plate load is the same as the rotational center of the output shaft



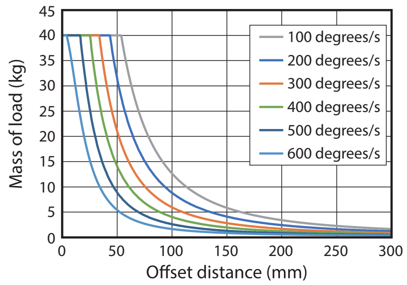
■ When the center of gravity of the load is offset from the rotational center of the output shaft



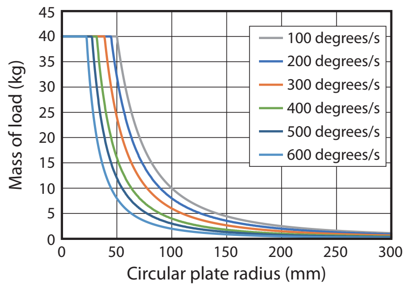
Acceleration 0.3G (energy-saving setting disabled)



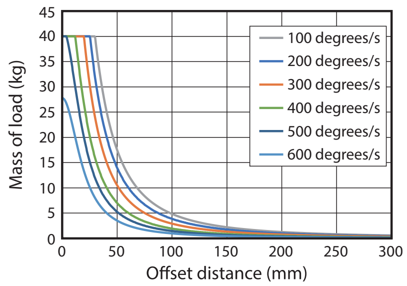
Acceleration 0.3G (energy-saving setting disabled)



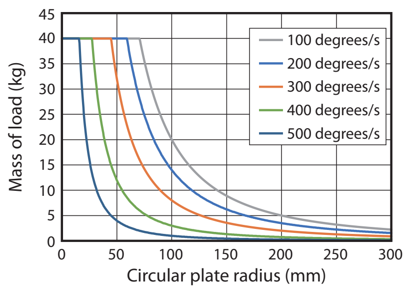
Acceleration 0.7G (energy-saving setting disabled)



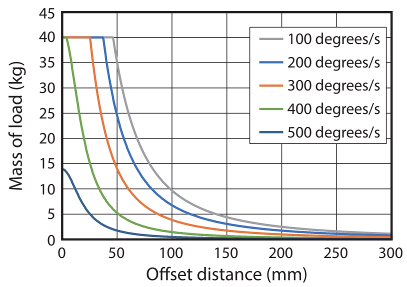
Acceleration 0.7G (energy-saving setting disabled)



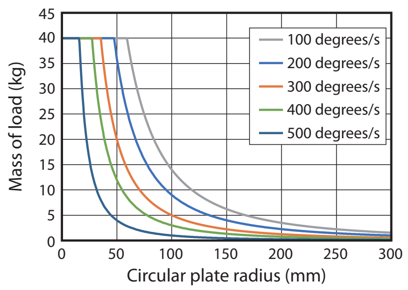
Acceleration 0.3G (energy-saving setting enabled)



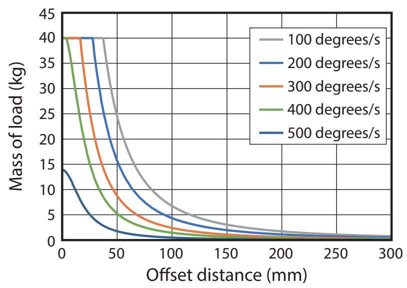
Acceleration 0.3G (energy-saving setting enabled)



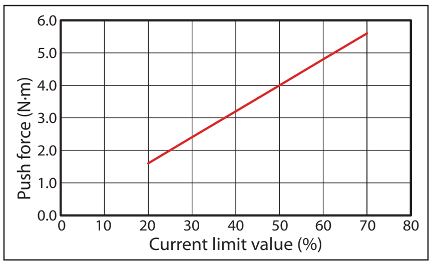
Acceleration 0.5G (energy-saving setting enabled)



Acceleration 0.5G (energy-saving setting enabled)



Correlation of push force and current limit value

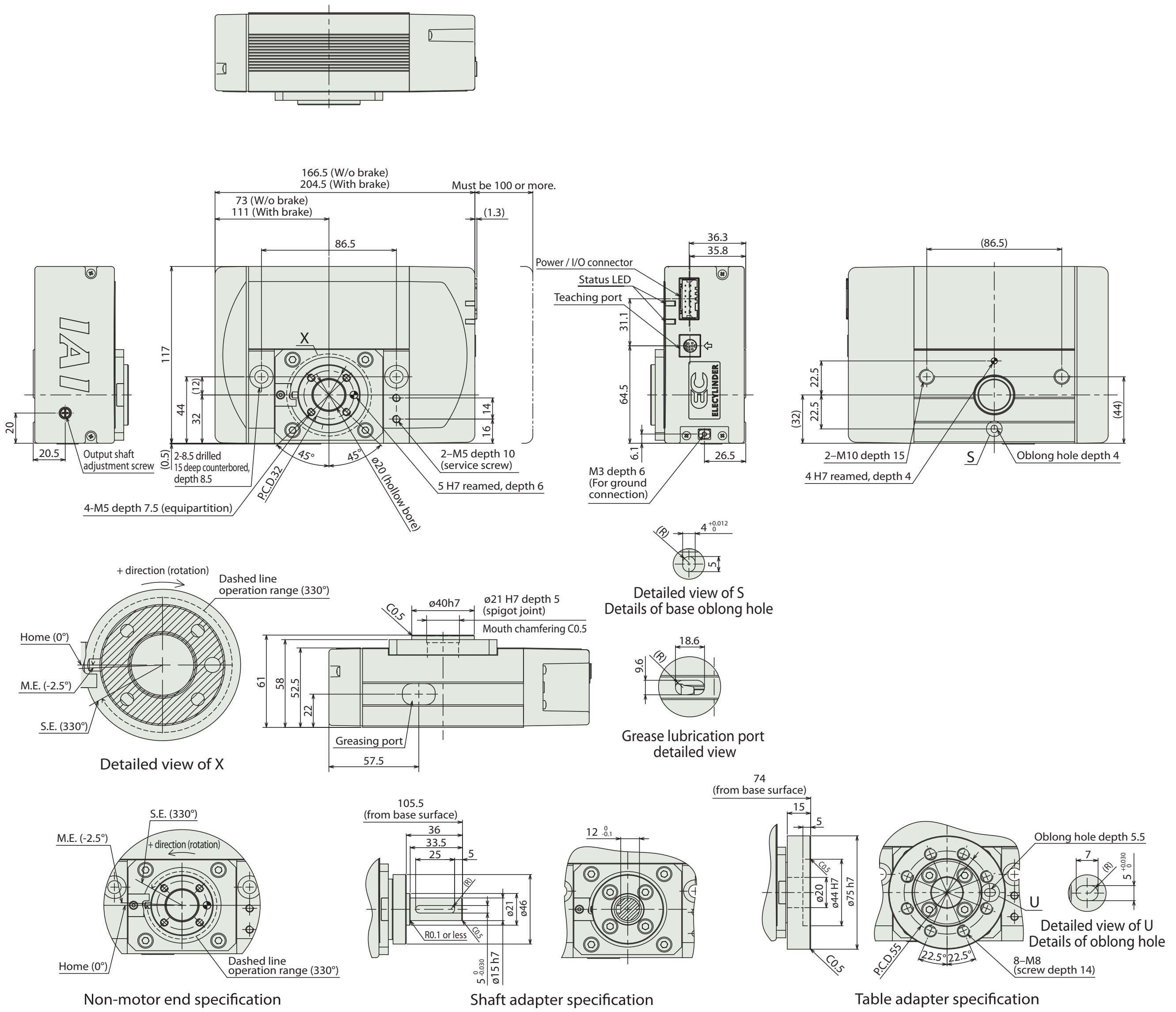


Dimensions

CAD drawings can be downloaded from our website.
www.elecylinder.de
2D CAD
3D CAD

(Note) Rotating parts are shown shaded in the plane figures below.

M.E: Mechanical end
S.E: Stroke end



■ Mass

Item		Description
Mass	Without brake	1.74kg
	With brake	1.90kg

Applicable controllers

(Note) The EC series is equipped with a built-in controller. Please refer to P.13 for more information on built-in controllers.

Options for the EleCylinder series

Brake

Model **B**

Description When using the rotary on its side or vertically, this holding mechanism prevents the output shaft from accidentally rotating due to the weight of the attached object, and damaging the attached object when the power or servo is turned off.

Non-motor end specification

Model **NM**

Description The positive rotation direction will normally be clockwise when viewing the rotating part from above.
Counterclockwise can optionally be set as the positive rotation direction.
Contact IAI if you would like to change the rotation direction after shipment.

PNP specification

Model **PN**

Description The EC series offers NPN specification input/output for connecting external devices as standard.
Specifying this option changes input/output to PNP specification.

Shaft adapter

Model **SA**

Description This adapter is used to mount jigs, etc., to rotating parts.
Refer to the dimensions on the individual product page for detailed dimensions.

Table adapter

Model **TA**

Description This adapter is used to mount jigs, etc., to rotating parts.
Refer to the dimensions on the individual product page for detailed dimensions.

Twin power supply specification

Model **TMD2**

Description This option provides a separate motor power supply and control power supply.
Please refer to P.15 for more information on wiring.

Battery-less Absolute Encoder specification

Model **WA**

Description The EC series offers incremental encoder specification as standard.
Specifying this option installs a built-in battery-less absolute encoder.

Wireless communication specification

Model **WL**

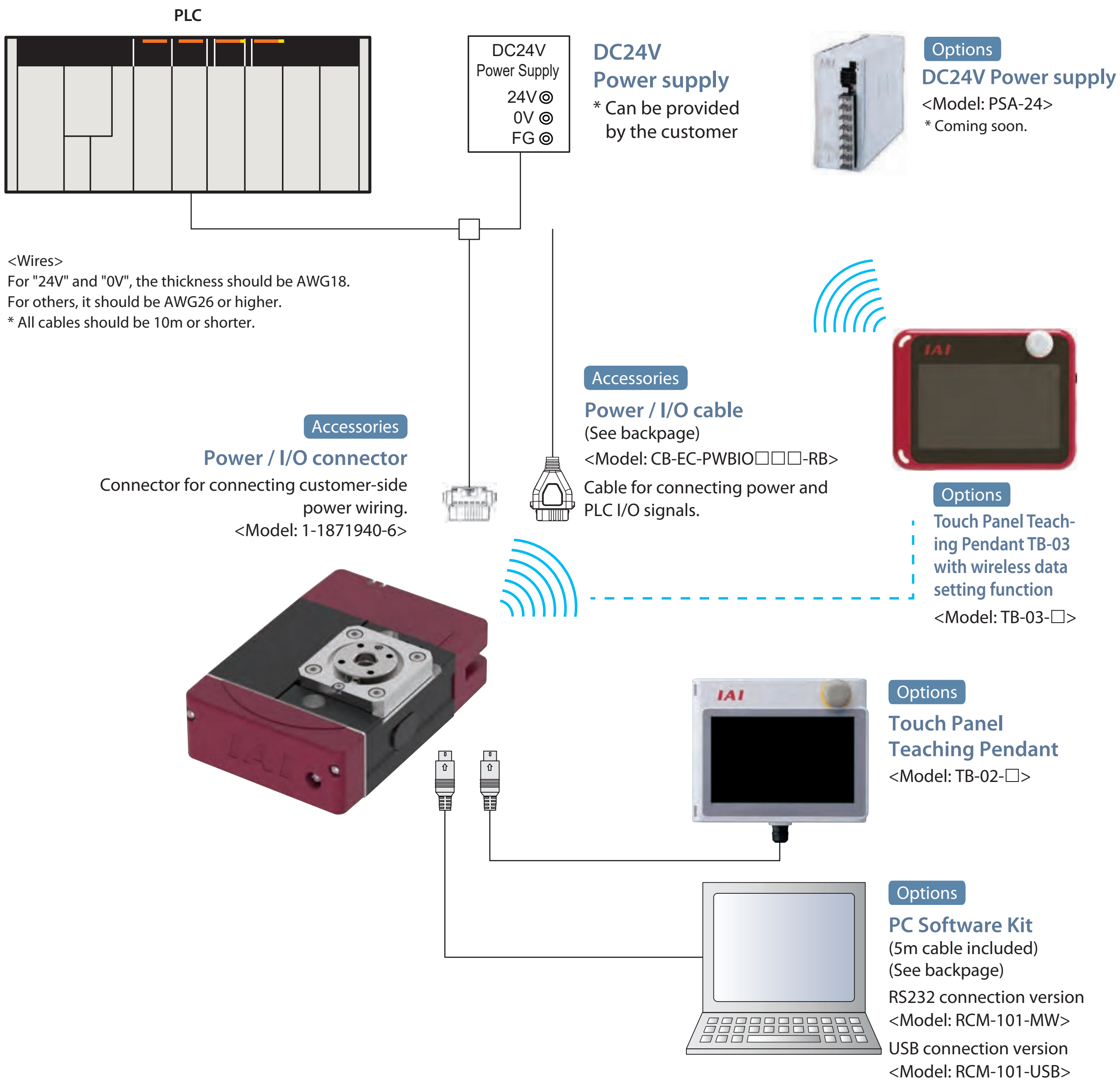
Description This option supports wireless communication. Specifying this option enables wireless connection with the TB-03 teaching pendant.
The start point, end point, and AVD can be adjusted by wireless communication.

Wireless axis operation specification

Model **WL2**

Description Specifying WL2 allows for the product to operate wirelessly as with WL (start point, end point, and AVD adjustment), and to also perform axis travel operation tests (forward end/backward end movement, jog, and inching). However, this function is not meant to perform automatic operation. Refer to P.118 of the EC General Catalogue V10 for precautions on axis operations using a wireless connection.
(Note) WL cannot be changed to WL2, or WL2 to WL, by the customer. Please contact IAI for this.

System Configuration



List of Accessories

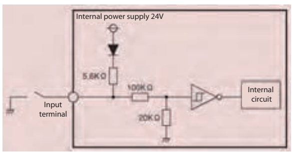
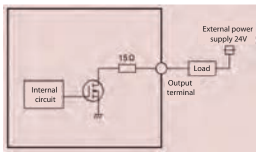
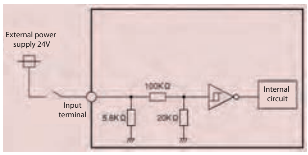
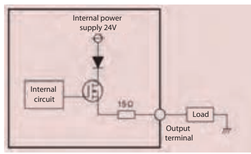
Product category	Accessories
Without EC power / I/O cable (When cable length "0" is selected for actuator type)	Power / I/O connector (1-1871940-6)
With EC power / I/O cable (When cable length "1" to "10" is selected for actuator type)	Power / I/O cable (CB-EC-PWBIO□□□-RB)

Basic Controller Specifications

<table>
<tr><th colspan="3">Specification item</th><th>Specification content</th></tr>
<tr><td colspan="3">Number of controlled axes</td><td>1 axis</td></tr>
<tr><td colspan="3">Power supply voltage</td><td>24VDC ±10%</td></tr>
<tr><td colspan="2" rowspan="2">Power capacity</td><td>RTC9</td><td>Max. 2A (with energy-saving setting enabled only)</td></tr>
<tr><td>RTC12</td><td>With energy-saving setting disabled: Rated 3.5A, max. 4.2A
With energy-saving setting enabled: Max. 2.2A</td></tr>
<tr><td colspan="3">Brake release power supply</td><td>24VDC ±10%, 200mA (only for external brake release)</td></tr>
<tr><td colspan="3">Generated heat</td><td>8W (at 100% duty)</td></tr>
<tr><td colspan="2" rowspan="2">Inrush current (Note 1)</td><td>RTC9</td><td>2A</td></tr>
<tr><td>RTC12</td><td>8.3A (with inrush current limit circuit)</td></tr>
<tr><td colspan="3">Momentary power failure resistance</td><td>Max 500μs</td></tr>
<tr><td colspan="3">Motor size</td><td>□28, □42</td></tr>
<tr><td colspan="3">Motor rated current</td><td>1.2A</td></tr>
<tr><td colspan="3">Motor control system</td><td>Weak field-magnet vector control</td></tr>
<tr><td colspan="3">Supported encoders</td><td>Incremental (800 pulse/rev), battery-less absolute encoder (800 pulse/rev)</td></tr>
<tr><td colspan="3">SIO</td><td>RS485 1ch (Modbus protocol compliant)</td></tr>
<tr><td rowspan="10">PIO</td><td rowspan="5">Input specification</td><td>Number of input</td><td>3 points (forward, backward, alarm clear)</td></tr>
<tr><td>Input voltage</td><td>24VDC ±10%</td></tr>
<tr><td>Input current</td><td>5mA per circuit</td></tr>
<tr><td>Leakage current</td><td>Max 1mA/1 point</td></tr>
<tr><td>Isolation method</td><td>Non-isolated</td></tr>
<tr><td rowspan="5">Output specification</td><td>No. of output</td><td>3 points (forward complete, backward complete, alarm)</td></tr>
<tr><td>Output voltage</td><td>24VDC ±10%</td></tr>
<tr><td>Output current</td><td>50mA/1 point</td></tr>
<tr><td>Residual voltage</td><td>2V or less</td></tr>
<tr><td>Isolation method</td><td>Non-isolated</td></tr>
<tr><td colspan="3">Data setting and input methods</td><td>Teaching software for PC, touch panel teaching pendant</td></tr>
<tr><td colspan="3">Data retention memory</td><td>Position and parameters are saved in non-volatile memory. (No limit to rewrite)</td></tr>
<tr><td rowspan="2">LED display</td><td colspan="2">Controller status display</td><td>Servo ON (green light ON) / Alarm (red light ON) / Initializing when power comes ON (orange light ON) / Minor failure alarm (green/red alternately blinking) / Operation from teaching: Stop from teaching (red light ON) / Servo OFF (light OFF)</td></tr>
<tr><td colspan="2">Wireless status display</td><td>Initializing wireless hardware, without wireless connection, or connecting from TP board (light OFF)
Connecting through wireless (green blinking) / Wireless hardware error (red blinking) / Initializing when power comes ON (orange light ON)</td></tr>
<tr><td colspan="3">Predictive maintenance/Preventative maintenance</td><td>When the number of movements or operation distance has exceeded the set value and when the LED (right side) blinks alternately green and red at overload warning
* Only when configured in advance</td></tr>
<tr><td colspan="3">Ambient operating temperature</td><td>0 ~ 40°C</td></tr>
<tr><td colspan="3">Ambient operating humidity</td><td>85% RH or less (no condensation or freezing)</td></tr>
<tr><td colspan="3">Operating ambience</td><td>Avoid corrosive gas and excessive dust</td></tr>
<tr><td colspan="3">Insulation resistance</td><td>500VDC 10MΩ</td></tr>
<tr><td colspan="3">Electric shock protection mechanism</td><td>Class 1 basic insulation</td></tr>
<tr><td colspan="3">Cooling method</td><td>Natural air cooling</td></tr>
</table>

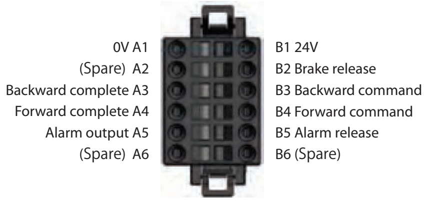
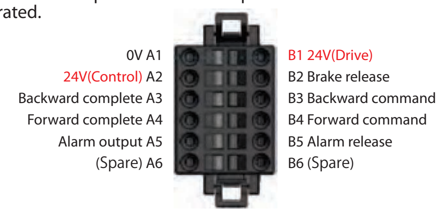
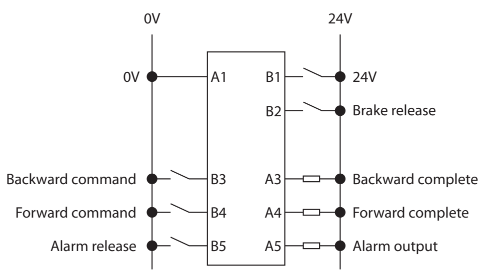
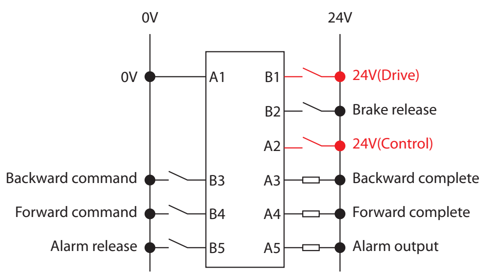
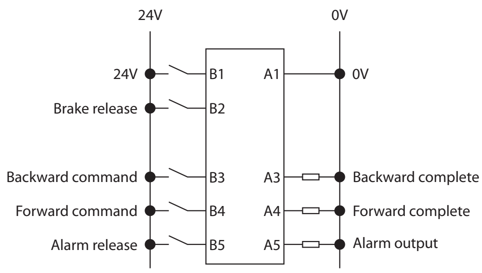
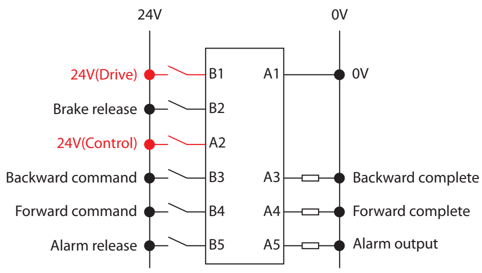
(Note 1) Inrush current flows for approximately 5ms after the power is input. (At 40°C.) Inrush current value differs depending on the impedance on the power supply line.

I/O Specification (Input/Output specifications)

I/O	Input		Output	
Specifications	Input voltage	DC24V±10%	Load voltage	DC24V±10%
	Input current	5mA/circuit	Max. load current	50mA/point
	ON/OFF Voltage	ON voltage MIN DC18V OFF voltage MAX DC6V	Residual voltage	2V or less
	Leak current	MAX 1mA/point	Leak current	MAX 0.1mA/point
Insulation method	Not isolated from external circuit		Not isolated from external circuit	
I/O logic — NPN				
I/O logic — PNP				

(Note) Isolation method is non-isolated. When connecting an external device (such as a PLC) to EleCylinder, use the same ground as EleCylinder.

I/O Specification Wiring Diagram

I/O	Standard Specification	TMD2 Specification (Option)
Power• I/O connector		The TMD2 specification is a specification in which the motor power and control power are separated. 
I/O logic — NPN		
I/O logic — PNP		

I/O Signal Table

Power / I/O connector pin assignment			
Pin No.	Connector nameplate name	Signal abbreviation	Function overview
B3	Backward	ST0	Backward command
B4	Forward	ST1	Forward command
B5	Alarm cancel	RES	Alarm cancel
A3	Backward complete	LS0/PE0	Backward complete/push complete
A4	Forward complete	LS1/PE1	Forward complete/push complete
A5	Alarm	* ALM	Alarm detection (b-contact)
B2	Brake release	BKRLS	Brake forced release (for brake equipped specification)
B1 (Note)	24V	24V	24V input
A1	0V	0V	0V input
A2 (Note)	(24V)	(24V)	24V input

(Note) For the twin power supply specification (TMD2), B1 is 24V (drive) and A2 is 24V (control).

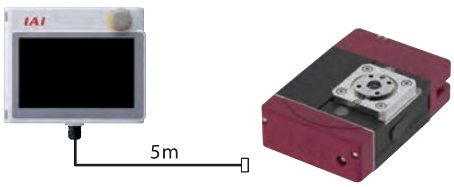
Options

Touch Panel Teaching Pendant

■ **Features** A teaching device equipped with functions such as position teaching, trial operation, and monitoring.

■ **Model** **TB-02-□** Please contact IAI for the current supported versions.

■ **Configuration** Wired connection



■ **Specifications**

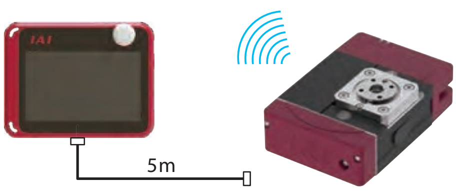
Rated voltage	24VDC
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0 to 40°C
Ambient operating humidity	20 to 85% RH (Non-condensing)
Environmental resistance	IP20
Mass	470g (TB-02 unit only)

Touch Panel Teaching Pendant with Wireless Function

■ **Features** A teaching device that supports wireless connection. Start point/end point/AVD input and axis operation can be performed with wireless connection for WL option. Manual operation is wirelessly possible for WL2 option.

■ **Model** **TB-03-□** Please contact IAI for the current supported versions.

■ **Configuration** Wireless or wired connection



■ **Specifications**

Rated voltage	24VDC
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0 to 40°C
Ambient operating humidity	20 to 85% RH (Non-condensing)
Environmental resistance	IPX0
Mass	Approx. 485g (body) + approx. 175g (battery)
Charging method	Wired connection with dedicated adapter/controller
Wireless connection	Bluetooth 4.2 class2

Options

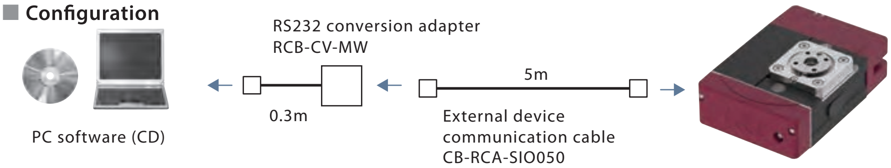
Teaching software for PC (Windows only)

■ **Features** The start-up support software comes equipped with functions such as position teaching, trial operation, and monitoring.
A complete range of functions needed for making adjustments contributes to shortened start-up time.

Supported Windows versions: 7/8/10

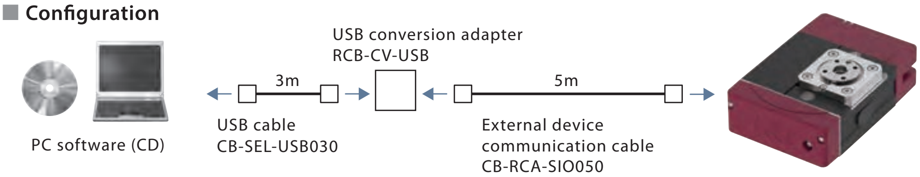
■ **Model** **RCM-101-MW** (with an external device communication cable + RS232 conversion unit) Please contact IAI for the current supported versions.

■ **Configuration**



■ **Model** **RCM-101-USB** (with an external device communication cable + USB conversion adapter + USB cable) Please contact IAI for the current supported versions.

■ **Configuration**



Maintenance Parts

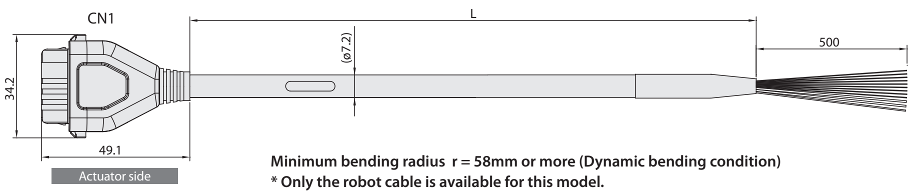
When placing an order for a replacement cable, please use the model name shown below.

■ **Table of compatible cables**

Model name	Power / I/O cable
EC	CB-EC-PWBIO□□□-RB

Model **CB-EC-PWBIO□□□-RB**

* Please indicate the cable length (L) in □□□, E.g.) 030 = 3m



Minimum bending radius r = 58mm or more (Dynamic bending condition)
*** Only the robot cable is available for this model.**

Color	Signal name	Pin No.
Black (AWG18)	0V	A1
Red (AWG18)	24V	B1
Light blue (AWG22)	(Reserved) (Note 1)	A2
Orange (AWG26)	IN0	B3
Yellow (AWG26)	IN1	B4
Green (AWG26)	IN2	B5
Pink (AWG26)	(reserve)	B6
Blue (AWG26)	OUT0	A3
Purple (AWG26)	OUT1	A4
Gray (AWG26)	OUT2	A5
White (AWG26)	(reserve)	A6
Brown (AWG26)	BKRLS	B2

(Note 1) 24V (control) when twin power supply specification (TMD2) selected.

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Quality and Innovation

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